

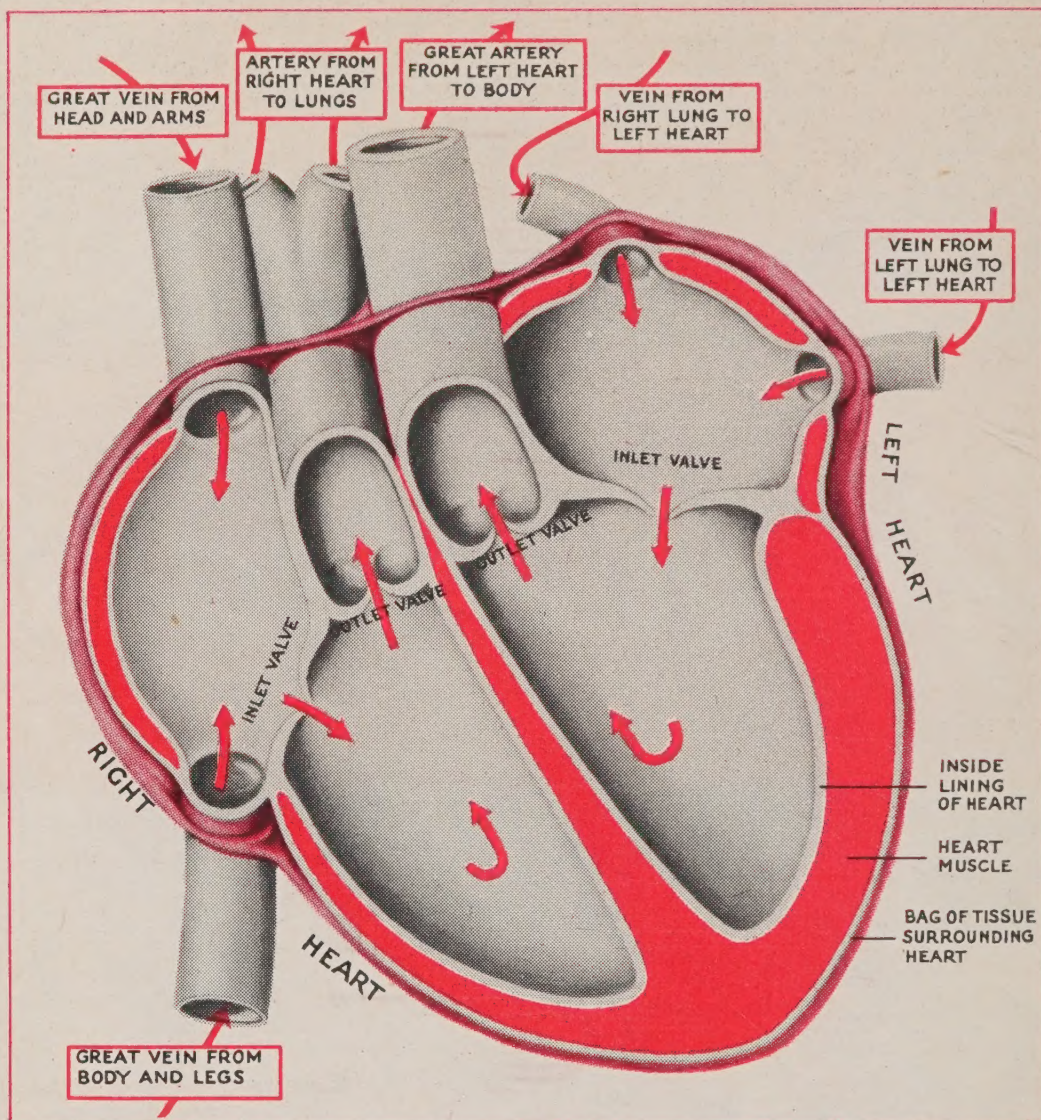
Your Heart

METROPOLITAN LIFE
INSURANCE COMPANY

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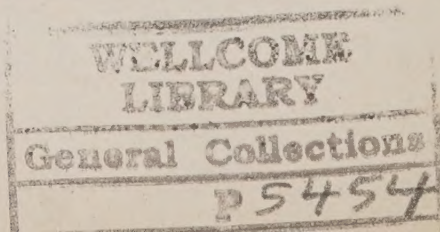
THE heart is a powerful hollow muscle divided, by a wall down the middle, into two main divisions — a right and a left. Each division has two chambers which work together as a unit. The blood stream flows from the body into the right side of the heart through veins. From there it is pumped to the lungs, where it gets rid of a waste gas (carbon dioxide) collected from the body cells and picks up a load of oxygen to carry to the body cells. After passing through the lungs the blood stream flows into the left side of the heart, from which it is pumped to the body through arteries.

The drawing on this page is not an exact representation of the heart in cross-section, but rather a pictorial diagram to show the course taken by the blood from the body
 → to the heart → to the lungs → back to the heart → and out to the body again.

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Your Heart

It Is True —

THAT there is an actual increase in heart disease, but this increase does not apply to all the people. Americans as a whole are living much longer than they used to live, because comparatively few lives are now cut short by the infectious diseases of childhood and youth. As a result there are many more older people in the population than there used to be, and it is in the older ages that the heart is most likely to get in trouble. The increase in heart disease that we hear so much about is primarily a problem of late middle and old age. In youth and early middle age there is much less heart trouble than there used to be.

It Is Not True —

THAT nothing can be done about heart disease. The heart may bear much and not break. It has tremendous reserves of power. The verdict of heart trouble in most cases does not mean death overnight. Thousands of persons with damaged hearts are living comfortable, happy, useful lives right now because they are co-operating with their doctors in giving their hearts a chance. Many of them may live as long as they could reasonably expect to live without heart trouble. Some of them even have a chance of complete recovery.

HEART FACTS

YOUR heart is only as big as your fist, but most of its bulk is muscle. It has just one job — to pump out into the arteries the blood returned to it by the veins. (See the pictorial diagram on the opposite page.) All the millions of cells in the body depend upon the rapidly circulating blood stream for the necessities of

life and the removal of wastes. The brain in particular must have a continuous supply of fresh oxygen. Since the brain runs the body, death comes within seconds — at most a very few minutes — after the heart stops beating.

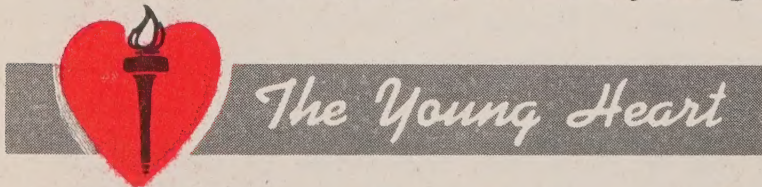
The amount of blood in your body is comparatively small — it makes up only about 8 percent of your body weight. But to keep that blood in circulation through miles of blood vessels during an ordinary day of work, play, and rest, the healthy heart pumps from 9 to 10 tons of blood at an average daily rate of 70 strokes per minute. The normal pumping action of the healthy heart is a continuous series of regular contractions and relaxations — beat — rest, beat — rest, beat — rest, and so on for about $2\frac{1}{2}$ billion times if the pumping continues for 70 years.

When you are “taking it easy,” your heart takes it easy. It then rests nearly twice as much as it works. But during periods of exceptional physical exertion or emotional stress it may beat twice as fast as usual and pump out twice as much blood. The faster the heart beats, the harder it works and the less time it has to rest. On this important fact is based much of the medical advice we are given regarding the protection of the middle-aged healthy heart and the care of the sick heart.

COMMON TYPES OF HEART DISEASE

HEART disease is a convenient term used to cover a multitude of different diseases, most of which are quite unrelated except as they all involve the heart or blood vessels.

The most common types of heart disease are those associated with infections, especially rheumatic fever and syphilis; or with high blood pressure; or with disease of the coronary arteries. Other less common but important types are caused by defects present in the heart or blood vessels at birth (congenital defects), or by overactivity or underactivity of the thyroid gland.



Heart Disease Associated With Infections

Generally speaking, it is possible for the heart to become involved in practically any infectious disease if the germs causing it or their

poisons are carried to the heart in the blood stream, or if the heart becomes exhausted in the fight put up by the body against the disease. In these days, however, very few cases of heart disease are caused by infections other than rheumatic fever and syphilis. One important reason for this is that many communicable diseases are now being prevented by immunization, or are being treated successfully with serums or drugs before they have a chance to infect or weaken the heart.

Heart disease caused by an infection goes by the name of the part of the heart affected, plus the ending *itis*, which means "inflammation of." Hence we have myocarditis, inflammation of the myocardium, or heart muscle; pericarditis, inflammation of the pericardium, the bag of membrane enclosing the heart; aortitis, inflammation of the aorta, the great blood vessel leading out of the lower left chamber of the heart; and endocarditis, inflammation of the endocardium, the membrane which lines the hollow heart muscle. Since the endocardium covers the valves of the heart as well as its inner walls, endocarditis frequently leaves scars which may cause narrowing (stenosis) of one or more valves or may interfere with their proper closing.

Rheumatic Heart Disease

Rheumatic heart disease begins nearly always in childhood between the ages of 6 and 12 as the result of one or more attacks of rheumatic fever. Many cases of rheumatic heart disease in adults may be traced to a partly forgotten or mild attack of rheumatic fever or chorea (St. Vitus's dance) in childhood.

The cause of rheumatic fever, which plays such havoc with young hearts, is not clear. The solution to the whole puzzle is now one of the chief objectives of medical research. Just as a lighted match starts a fire in kindling already laid in a stove or fireplace, so an attack of a disease caused by germs of the streptococcus family — for example, tonsillitis, scarlet fever, or a streptococcal cold — often lights up rheumatic fever in a child or young adult who is susceptible to it. What makes an individual susceptible seems in most cases to be an inherited tendency to rheumatic fever, which may be increased by poor diet, inadequate protection from cold and damp, and crowded living conditions that give germs a chance to spread easily from throat to throat. Unfortunately, one attack of rheumatic fever makes a child more susceptible, rather than immune, to further attacks, and repeated attacks are more likely to damage the heart.

The earliest symptoms of rheumatic fever may be slight fever, nosebleeds, loss of appetite, failure to gain weight, and pain (often vague and fleeting) in joints and muscles. The uncontrollable twitching or jerking of the face, arms, or legs, commonly known as St. Vitus's dance, is sometimes a sign of rheumatic fever. This disease may attack all parts of the heart and, in some cases, clear up with little or no trace. But commonly it leaves scars in the endocardium which interfere more or less with the working of one or more of the valves of the heart. By following the advice of the physician with regard to work and play, individuals with rheumatic heart disease, whose hearts have not been too severely scarred, may lead productive and normal or near-normal lives.

Prompt and continuing medical care during attacks of rheumatic fever is essential, and good nursing care is of prime importance. The child must be kept in bed during the active stage in order to give the heart the rest it requires to make as good a recovery as possible. The doctor is the one to say when the child may get up and how active he may be as he returns to normal living.

The best, but not absolutely certain, protection against recurrences is periodic medical supervision, with emphasis on the proper balance between rest and activity, good nutrition, and protection from respiratory infections. The use of sulfa drugs under medical supervision to ward off the streptococcus infections which so often light up rheumatic fever is giving promising results in preventing recurrences in susceptible children.

Syphilis of the Circulatory System

Syphilis continues to be a common cause of infectious disease of the heart and blood vessels. This disease does more damage to the aorta than to other arteries or to the heart itself. Probably the germs (spirochetes) of syphilis invade the heart and aorta soon after they first enter the body, but as a rule actual disease of these organs does not appear for many years. Fortunately syphilis of the heart and arteries is now a preventable disease, since the spirochetes can be destroyed before they damage the aorta or heart if treatment is begun in the first, or chancre, stage.

Bacterial Endocarditis

This serious infection of the endocardium, or heart lining, is caused in most cases by an invasion of bacteria of the coccus family. These bacteria are much more likely to gain a foothold if rheumatic heart disease or a congenital defect or some other ab-

normal condition already exists. The rare acute form is caused by any one of several different kinds of bacteria which may enter the blood stream and attack the heart in the course of an illness elsewhere in the body — for example, pneumonia or meningitis. In the more common subacute form, streptococcus viridans (the green streptococcus) is usually responsible. This germ hides and multiplies in blood-clot nests in the endocardium. With the sulfa drugs and penicillin at the physician's disposal, the outlook for the control of bacterial endocarditis is much more hopeful than it was a very few years ago.



The Middle-Aged Heart

Heart Disease Associated With High Blood Pressure

High blood pressure, or hypertension, is the most common cause of heart disease in middle age. What hypertension is and why it causes heart disease are known. But what causes hypertension itself is still a puzzling question. Many cases of hypertension are associated with disease of the kidneys (renal hypertension) or with a disease or functional disturbance of the nervous system or endocrine glands. The majority of cases of hypertension, however, are labeled "Cause Unknown."

High blood pressure which develops without any discoverable cause is called essential hypertension. It seems to run in some families, many members of which through several generations have had essential hypertension or troubles associated with it. Also it appears to be most common among people who are overweight.

What "Blood Pressure" Is

Everyone has blood pressure. It is simply the pressure of the blood against the walls of the arteries which are always completely filled with blood. Everyone's blood pressure goes up and down. It is highest during systole, the period when the heart pumps a fresh load of blood into the elastic-walled arteries which stretch to accommodate it, and lowest during diastole, the period when the heart pauses between beats to fill with blood. High blood pressure is commonly taken to mean high systolic pressure. However, the diastolic pressure is fundamentally the more important of the two, because it represents the basic pressure exerted on the arterial

walls independently of the additional pressure due to the contraction of the heart. The physician also attaches great importance to the relationship between the systolic and diastolic pressures. The difference between the two is called the pulse pressure.

The second factor which makes everyone's blood pressure normally an up-and-down affair is the way the arterioles behave during emotional stress. These tiny blood vessels are the smallest branches of the arteries. They are controlled by nerves which automatically make them constrict (tighten up) or dilate (open wider). They tighten up when you are all keyed up with joy, fear, anger, worry, or working under tension. When they constrict, less blood can get into them from the arteries, and so the pressure of blood in the arteries goes up. When the excitement is over they dilate (open wider), and the pressure goes down.

Hypertension, or high blood pressure, means simply that through some nervous or toxic influence the arterioles throughout the body — and there are miles of them — are kept more or less constantly in a constricted, or tightened-up, state.

Hypotension, or low blood pressure, means that the blood pressure remains more or less constantly within or below the lower limits of normal pressure. Unlike high blood pressure, it does not cause heart disease. Indeed, low blood pressure seldom causes real illness of any kind, and definite diseases in which it occurs are very rare. Individuals who are physically below par, especially if they are underweight, may have hypotension. However, the blood pressure of many healthy individuals tends to be lower than the average for their age. If your doctor concludes that you are one of these "low-normal" individuals, you may consider yourself fortunate because you may expect to live longer than other people.

How High Blood Pressure Affects the Heart and Arteries

The effect of hypertension on the heart is what you might expect if you screwed down the nozzle of a hose connected with a water pump. Just as the pump would have to work harder against increased resistance in the hose to keep water spraying out of the nozzle in the same volume as before, so the heart must work harder against increased resistance in the arteries to keep blood flowing through the constricted arterioles at nearly the normal rate. To take care of this extra work the heart muscle is forced to enlarge. And often, but not always, the walls of the arteries become scarred and thickened — a process called sclerosis, or hardening, of the arteries (arteriosclerosis).

A strong heart and wear-resistant arteries may be able to cope

with high blood pressure for years without much trouble. In some cases there may be no symptoms at all; in others, there may be headaches, dizziness, general aches and pains, and possible shortness of breath. These symptoms also appear in other common conditions. Instead of wondering whether you have high blood pressure the sensible thing to do is to see your doctor.

Sometimes high blood pressure clears up of itself before it has a chance to damage the heart and blood vessels, or it may be lowered to a safe level by drugs or diet or surgery if it is discovered in time. Even malignant hypertension, a severe form of high blood pressure which often progresses very rapidly, has recently been treated with good results in some cases.

Persistent high blood pressure, however, nearly always results in enlargement of the heart muscle — the first step in the development of hypertensive heart disease. The progress of hypertensive heart disease to the point of heart failure can often be delayed for many years, even into old age, by following the doctor's advice and leading a life of moderation in all things — in work and play, in eating, in smoking, in emotional reactions.



The Aging Heart

Coronary Heart Disease

Heart disease caused by disease of the coronary arteries, which have the job of supplying the heart muscle itself with blood, is most common after age 50. Thickening of the coronary arteries (coronary arteriosclerosis), usually associated with hypertension, is the chief cause of coronary disease. Its harmful effect on the heart is explained by the reduction of the blood supply of the heart muscle (the myocardium) which occurs when the coronary arteries are narrowed or blocked. However, the reserve strength of the heart muscle and its blood supply are both so great that they are not easily exhausted. Many people are able to live quite comfortably with coronary heart disease if they are careful not to place too great a strain on their hearts. With the object not only of prolonging their lives but also of enabling them to be useful and happy, the physician helps them to strike a balance between too

many and too few restrictions. The main thing to strive for is equanimity. Some people with a comparatively small amount of heart damage and disability make themselves worse through sheer nervousness.

Angina Pectoris

The inability of the coronary arteries to perform their duty properly is made plain by a symptom so important that it is often regarded as a disease in itself. This symptom is called *angina pectoris*. Angina pectoris is a painful, strangling, oppressive sensation under the breastbone, frequently radiating down the arms, which is brought on by exertion and lasts for only a few minutes. It is not like any ordinary pain in the chest, and a person who has had it once seldom needs to be persuaded to see a doctor.

Coronary Thrombosis

The most serious "accident" which may occur in coronary disease is the sudden closing (occlusion) of a coronary artery by a blood clot (thrombus). It causes severe crushing pain in the chest, accompanied by weakness, pallor, and sweating, which persists in spite of rest. Sometimes the pain is mistaken for acute indigestion. A doctor should be summoned at once, because this is a real heart emergency. However, the great majority of persons survive the first attack of coronary thrombosis, and most of the survivors live for many years. After the damage done to the heart muscle has had opportunity to heal through a long rest in bed, the heart has an excellent chance to recover sufficiently to allow normal or near-normal activities.

SIGNS AND SYMPTOMS

IT is important to realize that the heart may be innocent of causing many of the feelings of discomfort which are frequently blamed on it. The cavity of the chest and the upper part of the abdomen, which is separated from the chest by only a thin sheet of muscle, are packed tightly with organs. Any extra pressure, such as gas in the stomach or small intestine, for example, may give rise to pain in the chest with which the heart has nothing whatever to do. On the other hand, any discomfort in the chest *which is directly related to exertion or excitement* should be a signal to consult a physician.

The heart itself may at times act queerly without having anything organically wrong with it. Common but annoying experiences of this kind are skipped beats, palpitation (consciousness of the heart beat), and very rapid beating of the heart. Noticeable misbehavior of the heart beat, or any other annoying symptoms which may make you think you have heart trouble, should always be investigated by a physician. If the physician, after a careful examination, says that nothing is wrong with your heart, *believe him*. Many people make themselves miserable by continuing to think that they have heart disease, even after one or more physicians have told them that their hearts are sound.

There are a few symptoms which should *always* be investigated, because they indicate the need of medical attention whether they are due to heart trouble or not. One of these is shortness of breath when at rest or on exertion which has not previously caused breathlessness. Shortness of breath associated with moderate exertion is an early symptom of a weakened heart muscle. It is caused most commonly by the congestion of blood in the lungs which occurs when the left side of the heart fails to pump on all the blood it receives from the right side via the lungs. Sudden acute attacks of breathlessness may come on while in bed at night. When asthmatic breathing complicates this form of breathlessness, the condition is called cardiac asthma.

Swelling of the feet and ankles is another early sign of possible heart weakness. When the circulation is slowed up because the heart fails to pump with its customary vigor, fluid may gather in the tissues and cause swelling, which is usually first noticed in the feet and ankles.

THE HEART-BLOOD VESSEL EXAMINATION

THE ideal way to forestall the onset of heart trouble is to see your doctor for a check-up every year and to consult him between times at the appearance of one or more of the symptoms which *may* or *may not* indicate heart trouble or hypertension.

If you tell the doctor you are worried about your heart or your blood pressure, the first thing he will do is to ask you to describe your symptoms. Symptoms are indications of trouble, like pain, which only you can feel. As they give the doctor important information about you, it is essential that you describe them honestly

and carefully. The doctor will then proceed to look for signs of trouble — things which he himself can detect with the help of various instruments and tests.

Checking Up on Your Blood Pressure

In taking your blood pressure your physician will measure the amount of pressure exerted by the blood against the main artery of your arm at the peak of the heart beat (systole) and at the pause between beats (diastole). The apparatus the doctor uses is familiar to almost everyone because blood pressure is now measured in the course of practically every medical examination, although this procedure came into general use only a generation ago.

If necessary, the doctor will also examine the interior of your eyes with an instrument called an ophthalmoscope, which enables him to see the minute blood vessels at the back of the eye. Since these blood vessels are similar to those in other less accessible regions of the body, the ability to observe them directly gives the doctor an idea of how good your blood vessels are. From an analysis of your urine (urinalysis), and perhaps by other tests of kidney function, your doctor will gain valuable information about the condition of your kidneys. This knowledge is important because high blood pressure or hypertensive heart disease is sometimes associated with kidney disease.

Checking Up on Your Heart

Usually the physician first feels (palpates) and taps (percusses) the cardiac region of the chest to determine the position, size, and shape of your heart. In addition, he may ask you to stand behind the screen of a fluoroscope while he studies the shadow of your heart cast by X-rays on the screen. To have a permanent record for further study and future comparison, he may also have an X-ray picture taken.

By listening to the sounds made by your heart in action through a stethoscope, which magnifies them, the doctor is able to detect "murmurs" or other deviations from normal. Heart murmurs are gentle, blowing sounds which may or may not indicate that something is wrong with the heart. A great many murmurs have little or no importance. Others may indicate that damage has been done to the valves or heart muscle as a result of rheumatic heart disease or some other condition.

The physician may also wish to have an electrocardiogram made.

This is a written record of the electrical activity which sweeps down and over your heart at each heart beat. The sensitive apparatus that does the writing at the dictation of the heart is called an electrocardiograph. The physician can tell whether the wave patterns recorded in an electrocardiogram are normal or abnormal, and so gain additional evidence about the condition and action of your heart muscle.

In addition to these methods of examining the heart, there are many others which your doctor will use if he thinks it necessary. For example, the extent and speed with which the red cells of the blood settle down when a sample of blood is allowed to stand in a column (sedimentation test) is a valuable means of uncovering rheumatic and other infections. Determining the way the heart behaves in various forms of physical exercise may be used in testing the heart's function. In short, there are now so many ways of taking the guesswork out of the heart examination that it is no wonder that our doctors today are able to make more accurate diagnoses than could doctors in the old days.

LIVING WITH HEART DISEASE

If the doctor finds that you have any form of heart trouble after making his examination, he will tell you because he must depend upon your cooperation. He has at his command many potent drugs and new surgical techniques, but he cannot live your life for you. And in the long run it is the way you live, more than the medicines you take, that determines how long and how happily you will live with an impaired heart.

The object of the way of living which doctors usually recommend for persons with heart trouble is the lifting of all removable burdens — for example, those imposed by fatigue, obesity, infections, and emotional upsets.

Exercise and Rest

The speeding up of the heart's action which accompanies sudden or violent or prolonged physical exertion can easily be accommodated by healthy young hearts, but it puts an extra and unnecessary strain on damaged or middle-aged hearts. The amount of exercise which a person with heart disease or high blood pressure may take will be carefully prescribed by the physician, and the patient must use judgment and discretion in carrying out the

doctor's advice according to his ability to perform without getting tired or out of breath.

Things to remember are:

- ¶ 1. Don't *run* or walk fast to catch anything — train, bus, streetcar, plane, or any other vehicle. As the saying goes, "It is better to miss it and live than catch it and die."
- ¶ 2. Don't walk against a high wind, as this throws an extra strain on the heart.
- ¶ 3. Don't do any more climbing than is necessary — if you must go up stairs or up hill, do it slowly with frequent rests.
- ¶ 4. Slow up — use moderation — in everything you do. Get out of bed slowly — never jump out. Cut down the speed at which you work, or work for shorter hours if possible. The doctor may advise a change of occupation if your present work is too fatiguing.
- ¶ 5. Go to bed early. Take a nap or at least lie down during the afternoon. When you are asleep or resting, your heart gets extra rest.

Eating

Eating big meals taxes the heart, since its work is increased during digestion. *Also, overeating is the most common cause of obesity, and carrying around an extra load of fat puts extra strain on the heart.*

When a person is sick in bed with heart trouble, the physician usually restricts the amount of food and fluid allowed. In all cases, moderation in eating is usually advised both to keep weight down and to lighten the work of the heart. Five or six light meals a day are sometimes better for the heart than three large, heavy meals. In some cases the doctor may prescribe a special diet. There is no one special diet which will apply in all cases. Specific dietary instructions must be provided by the physician to fit the need of each individual.

Smoking

So far as we know now, smoking tobacco does not cause actual heart disease, but excessive smoking may cause disagreeable disturbances of the heart beat, even in healthy people, and aggravate the symptoms in certain types of heart disease. Recent experiments have shown that smoking tobacco makes the arterioles tighten up, just as they do under emotional stress, and constriction of the arterioles raises the blood pressure. Hence smoking may have a harmful effect in arteriosclerosis and in heart disease associated with arteriosclerosis and high blood pressure. A person with heart

trouble or hypertension may feel better if he avoids the use of tobacco, and in some cases the physician may forbid smoking.

Avoiding Infections

A person whose heart is already handicapped must take care to avoid the added burden and possible risk of further damage imposed by infections, such as colds, sore throats, pneumonia, and infections of the sinuses and teeth. Anyone with heart trouble who develops an acute infection should go to bed and call his doctor. On recovery he will require a longer convalescence and a more gradual return to work than would a person with a normal heart.

Keeping in Touch With the Doctor

A person with heart trouble must keep in close touch with his doctor. His diet, weight, activity, rest — in short, his way of life — are more important than drugs and require constant medical supervision. Although some forms of heart disease are benefited by medicines, the drugs employed are extremely powerful, and their effect on a particular patient must be checked frequently.

Philosophy of Life

Cultivating a serene, optimistic outlook on life helps a great deal in relieving an impaired heart of unnecessary strain. This may be difficult for people who have always been high-strung — quick on the emotional trigger — prone to work too hard or worry too much. Yet the people who are willing to slow up their previous living pace — to go ahead with less speed, less haste, less worry, less fear; who accept the situation and adjust to it cheerfully, coaxing their hearts along without letting their impairment become an obsession—these are the people who have the best chance of a full, happy, and prolonged existence *despite* heart trouble.



Other *Metropolitan pamphlets* which may be of interest to the reader are as follows:

Overweight and Underweight
The Family Food Supply
Rheumatic Fever

Respiratory Diseases
Good Teeth
Spotlight on Venereal Diseases

The text of this pamphlet was prepared with the cooperation and advice of the American Heart Association, 1790 Broadway, New York 19, N. Y. For information about other publications relating to heart disease, write to that Association.



The "Heart and Torch" is the symbol of the American Heart Association